

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**INTERDEPARTMENT CORRESPONDENCE**

**FILE:** EDS-545(43) McDuffie/Warren  
P.I. No. 222590  
S.R. 17/U.S. 1 Widening/Reconstruction

**OFFICE:** Engineering Services

**DATE:** January 31, 2007

**FROM:**  Brian K. Summers, PE, Project Review Engineer

**TO:** Babs Abubakari, State Consultant Design and Program Delivery Engineer

**SUBJECT: IMPLEMENTATION OF VALUE ENGINEERING STUDY  
ALTERNATIVES**

Recommendations for implementation of Value Engineering Study Alternatives are indicated in the table below. Incorporate the VE alternatives recommended for implementation to the extent reasonable in the design of the project.

ALT #	Description	Potential Savings/LCC	Implement	Comments
<b>ROADWAY/PROFILE (RW)</b>				
1.0	Modify profile to reduce earthwork from Sta. 351+00 to Sta. 410+00	\$1,715,400 Proposed \$1,015,000 Revised	Yes	Maximum tangent grade will be changed to 4%
2.0	Modify profile to reduce earthwork from Sta. 546+00 to Sta. 628+00	\$3,146,500 Proposed 2,000,000 Revised	Yes	Maximum tangent grade will be changed to 4%
3.0	Change pavement structure to 8.7% under design by reducing the graded aggregate base course from 12" to 10"	\$1,636,800	Yes	This will be done
4.0	Reduce pavement depth of outside paved shoulders	\$1,197,000	Yes	This will be done

ALT #	Description	Potential Savings/LCC	Implement	Comments
<b>ROADWAY/PROFILE (RW) - CONTINUED</b>				
5.0	Provide bicycle lane on Northbound shoulder only and 4 ft. paved outside shoulder on Southbound side	\$781,800	No	Does not agree with current GDOT Bicycle/Pedestrian Guidelines.
8.0	Coordinate design with Thomson Bypass project	Design Suggestion	Yes	This will be done.
10.0	Consider modifying side road alignments to improve intersection angles	Design Suggestion	Yes	This will be done where possible.
13.0	Use PCC Pavement in intersections where loaded Kaolin trucks are crossing the mainline or turning movements are heavy	Design Suggestion	No	Traffic counts do not appear to justify the additional expense.
<b>STRUCTURAL/BRIDGE (SB)</b>				
1.0	Optimize Reedy Creek Bridge with 2-spans - Type III PSC Beams (65'-8") and 72" Bulb Tee Beams (131'-4") in lieu of 3-spans - Type III PSC Beams (65'-8" Each)	\$85,000	No	Might require larger columns and footings on the Intermediate Concrete Bents due to the unbalanced loads. Additional costs could also be incurred due to the longer deeper beams and the larger crane that would be required.
2.0	Optimize Little Brier Creek Bridge with 2-spans - Type II PSC Beams (72'-0" Each) on PSC Pile Bents in lieu of 6-spans - T-Beams (36'-0" Each)	\$248,000	Yes	This will be done.
2.1	Optimize Little Brier Creek Bridge with 2-spans - 54" Bulb Tee Beams (108'-0") on Reinforced Concrete Bent in lieu of 6-spans - T-Beams (36'-0" Each)	\$144,465	No	Would place intermediate concrete bents on the channel banks and could possibly require additional cofferdams. Longer deeper beams would require larger crane which would decrease cost savings.

ALT #	Description	Potential Savings/LCC	Implement	Comments
<b>STRUCTURAL/BRIDGE (SB)</b>				
4.0	Optimize Big Brier Creek Bridge with 2-spans Type III PSC Beams (67'-0") and 72" Bulb Tee Beam (134'-0") in lieu of 3-spans - Type III PSC Beams (67'-0" Each)	\$86,250	No	Might require larger columns and footings on the Intermediate Concrete Bents due to the unbalanced loads. Additional costs could also be incurred due to the longer deeper beams and the larger crane that would be required. In addition, the 72" Bulb Tee Beams would require a strength of 10,000 psi which is higher than what is normally used.

A meeting was held on January 31, 2007 and Yun Tang of Consultant Design, and Brian Summers, Ron Wishon and Lisa Myers of Engineering Services were in attendance.

The results above reflect the consensus of those in attendance and those who provided input.

Approved:  Date: 2/5/07  
David E. Studstill, Jr., P. E., Chief Engineer

BKS/REW

Attachments

c: Gus Shanine, FHWA  
Yun Tang  
Doug Franks  
Alexis John  
Ken Werho  
Nabil Raad  
Jimmy Smith  
Lynn Bean  
Richard Marshall  
Lisa Myers



November 8, 2006

Mr. Yun Tang, P.E.  
Office of Consultant Design  
Georgia Department of Transportation  
No. 2 Capitol Square, Room 446  
Atlanta, GA 30334

RE: Value Engineering Study Response: For Value Engineering Study, dated August 24, 2006,  
for project EDS 545(43).

Dear Mr. Tang:

Attached please find B&E Jackson's final responses to the VE Study report recommendations prepared by U.S. COST. Our draft comments were edited based on a meeting held with you on 11/02/06 and comments received from GDOT's Office of Bridge Hydraulics Department and GDOT's Bicycle Coordinator.

If you should require any additional information please contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Donald Miller".

Donald Miller, P.E.  
Project Manager.

Cc: Birdel Jackson, B&E President.

The following are our responses to the recommendations made within the Value Engineering Study, dated August 24, 2006, for project EDS 545(43).

**RESPONSES TO VE STUDY RECOMMENDATIONS  
EDS 545(43)**

**RW-1.0**      Modify profile to reduce earthwork from Sta. 351+00 to Sta. 410+00 (improves constructability and improves maintenance of traffic during construction).

The proposed change recommendation is to modify the profile from Sta. 351+00 to Sta. 410+00 by placing a 55mph sag vertical curve immediately adjacent to the bridge over Reedy Creek and raising the grade tangent to 4.57%. Use two crest vertical curves @ 65 mph speed design separated by a 950 foot grade tangent in lieu of one long vertical curve at Sta. 383+00. This more closely follows the existing road profile reducing the two cuts by +/- 169,000 c.y.

**RESPONSE** We agree with this recommendation. The amount of earthwork will be substantially reduced by raising the profile through this area. This design change will also improve constructability and the maintenance of traffic during construction. We recommend maintaining the sag curve at Sta. 355+ as a 65 mph curve and maintaining maximum 4% grades to the extent possible.

**RW-2.0**      Modify profile to reduce earthwork from Sta. 546+00 to Sta. 628+00 (improves constructability and improves maintenance of traffic during construction).

The proposed change recommendation holds the profile on the bridge over Little Brier Creek and immediately south of the bridge uses a -5% grade and two vertical 55 mph curves (1 sag & 1 crest) to reduce the cut section from Sta. 557+00 to Sta. 572+00. North of the bridge use a 4% grade and two 65 mph vertical curves (1 sag & 1 crest) in lieu of 1.92% grade. This more closely follows the existing profile reducing earthwork by 310,000 c.y.

**RESPONSE** We agree with this recommendation. The amount of earthwork will be substantially reduced by raising the profile through this area. This design change will also improve constructability and the maintenance of traffic during construction. We recommend maintaining the crest curve at Sta. 564+00 and the sag curve at Sta. 571+50 as 65 mph curves and maintaining maximum 4% grades to the extent possible.

**RW-3.0**      Change pavement structure to 8.7% under design by reducing graded aggregate base course from 12 inches to 10 inches. This will provide a

pavement structure that is 8.7% under designed but assumes an overlay in 10 years.

**RESPONSE** We agree with this recommendation. The approved Soil Survey prepared by ECS, LTD. Recommends 10 inches of graded aggregate base throughout the project with the exception of an area between Sta. 763+00 and 765+00 where they recommend an additional 4 inches of graded aggregate base be set up for use at the direction of the Engineer.

**RW-4.0** Reduce pavement depth of outside paved shoulders from 12" GAB, 440#/SY of 25 mm, 220#/SY of 19 mm and 135#/SY of 9.5 mm Asphaltic Concrete Superpave. The recommended pavement section would be 8" GAB, 444#/SY of 25 mm, and 135#/SY of 9.5 mm Asphaltic Concrete Superpave.

**RESPONSE** We agree with this recommendation to use less pavement depth on the outside shoulders. This recommendation will not compromise the design. If this recommendation is acceptable to GDOT, this can be implemented into the plans.

**RW-5.0** Provide bicycle lane on North bound shoulder only & 4 ft. paved outside shoulder on southbound side.

**RESPONSE** While this recommendation would represent a cost savings, the two-way bike lane on one side of the roadway would present an unsafe condition with bicycle traffic opposing automobiles. The 6.5 foot width for two-way bicycle traffic does not meet GDOT bicycle plan requirements. This road is designated as a state bike route and we therefore recommend maintaining the 6.5 foot bike lanes on each side of the roadway.

**RW-8.0** Coordinate design with Thomson Bypass project. The construction schedule for the Bypass project precedes the SR 17 project by 2 years and is currently in ROW acquisition. The proposed change is to construct the Thomson Bypass/SR 17 intersection with the Bypass project to include all approach lanes and signalization.

**RESPONSE** We agree that this recommendation makes sense. The intersection would only be disturbed with the Bypass construction and staging and the signals would not have to be replaced when the SR 17 project is constructed.

**RW-10.0** Consider modifying side road alignments to improve intersection angles. The proposed change recommendation is to consider realigning side road to intersect at no less than 85 degrees.

**RESPONSE** Currently 13 of the 23 intersections have intersecting angles of less than 85 degrees. Several of the existing intersections have been realigned to enhance the intersecting angle where this appeared feasible. The remaining intersections were kept with the same intersecting angles as they presently have. While the ideal situation would be to have all intersecting angles 90 degrees, this is not always possible.

**RW-13.0** Use PCC pavement in intersections where loaded Kaolin trucks are crossing the mainline or turning movements are heavy.

**RESPONSE** Three intersections have been identified with the heaviest through and turning movements. They are SR 17 Connector, CR 309/304 and CR 125. The movements for these intersections in 2027 ADT are:

SR 17 Connector	1700 thru	1175 turning
CR 309/304	825 thru	600 turning
CR 125	600 thru	500 turning

While PCC pavement may eliminate rutting, the vehicle counts are low and do not justify the use of PCC pavement.

**2:1 SLOPES** Also mentioned within the body of the report on page 4 is to revise proposed 2:1 side slopes to 3:1. There are many slopes that are 2:1 with guardrail.

**RESPONSE** While the Soils Report prepared by ECS, LTD. allows for 2:1 slopes, the GDOT District personnel feel that 2:1 slopes are not safe based on the soil characteristics of the area. The 2:1 slopes can be flattened to 3:1 in all areas where 2:1 are presently designed. We will evaluate the impacts on R/W caused by flattening the slopes and make recommendations.

**SB-1.0** Optimize Reedy Creek Bridge w/ 2-spans Type III PSC Beams (65'-8") & BT 72 Beams (131'-4") ILO 3-spans Type III PSC Beams (65'-8" EA.)

**RESPONSE** This proposal recommends replacing 2 AASHTO Type III beam spans with 1- span utilizing a 72-inch bulb tee PSC beam. In order to accomplish the 72-inch BT would have to utilize a concrete strength of 9,000 psi based on the current design charts in the GDOT Bridge and Structures Design Policy. According to the policy the maximum strength to be used is 8,000 psi. Higher strengths up to 10,000 psi would have to be

approved by the Bridge Department. Also the unbalanced load on the intermediate bent would result in possible larger columns and footings with more piles and a larger cofferdam which would significantly increase the cost of the proposed bridge layout. Additional costs would also be incurred due to the longer deeper beams and the larger crane required to set the beams.

Based on this information, we recommend the Value Engineering Proposal SB-1.0 not be implemented.

**SB-2.0** Optimize Little Brier Creek Bridge w/2-spans Type II PSC Beams (72'-0" EA.) on PSC Pile Bents ILO of 6-spans T-Beam (36'-0" EA.).

**RESPONSE** Based on the proposed design, if three spans are constructed using PSC Type II beams, VE study assumes that 7 beams in crosssection. But we cannot span 72 ft. using 6 ft (+/-) spacing as proposed in VE study. We need to reduce to 5 ft. spacing in order for design to work based on the current beam design charts. Also, at the present time HPC concrete is not yet widely being used and hence the unit cost of beams using HPC is not available. VE study also assumes that we can use PSC Concrete piles for substructure. But as the span lengths are 72 ft. as proposed, we may need to use concrete intermediate bents as substructure. This involves placing cofferdams, which would add to the construction cost. Additionally, the proposed alternative would be more expensive to build due to the longer deeper beams.

Based on this information, we recommend the Value Engineering Study Proposal SB-2.0 not be implemented.

**SB-2.1** Optimize Little Brier Creek Bridge w/2-spans BT 54 in. beams (108'-0"EA.) on RC Bent ILO 6-spans T-Beam (36'-0" EA.)

**RESPONSE** This proposed span arrangement would place intermediate concrete bents on the channel banks causing potential destruction to the channel banks and possibly resulting in higher scour depth. The proposed span arrangement would be more expensive to construct due to the longer deeper beams and the need for cofferdams at the intermediate bents.

Based on this information, we recommend the Value Engineering Study Proposal SB-2.1 not be implemented.

**SB-4.0** Optimize Big Brier Creek Bridge w/ 2-spans Type III PSC Beams (67'-0") & BT 72 Beams (134'-0") ILO 3-spans Type III PSC Beams (67'-0" EA.)

**RESPONSE** This comment recommends replacing 2 AASHTO Type III beam spans with 1- span utilizing a 72-inch bulb tee PSC beam. In order to accomplish the 72-inch BT would have to utilize a concrete strength of 10,000 psi based on the current design charts in the GDOT Bridge and Structures Design Policy. According to the policy the maximum strength to be used is 8000 psi. Higher strengths up to 10,000 psi would have to be approved by the Bridge Department. Also the unbalanced load on the intermediate bent would result in possible larger columns and footings with more piles and a larger cofferdam also which would significantly increase the cost of the proposed bridge layout. Additional costs would also be incurred due to the longer deeper beams and the larger crane required to set the beams.

Based on this information, we recommend the Value Engineering Study Proposal SB-4.0 not be implemented.